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ORIGINAL TRANSPORT DEVICE

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ORIGINAL TRANSPORT DEVICE

[Genko hanso sochi]

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[There are no amendments to this patent.]

Claim

In an original transport device equipped with a transport part that loads the original between the platen glass surface and the original presser sheet of a copier and that can feed said

original backward to butt against a butting plate, an original transport device characterized in having a sheet pressing means that can open and close the gap between the aforementioned sheet and the butting plate.

Detailed explanation of the invention

Industrial field of application

This invention relates to an improved original transport device that can automatically feed originals onto the platen glass of a copier.

Background of the invention

Generally this type of original transport device would be provided with a transport part whereby originals are pressed onto the platen glass surface with a white endless belt above the platen glass of a copier and the originals are transported by movement of said belt. That is, the transport part presses the original over the entire surface of the platen glass with the endless belt and also transports it while creating friction at appropriate spots on the original surface due to slight looseness. For this reason,

- (1) A space in the thickness orientation sufficient for the belt to turn is required, making the overall height of the device unit higher and making it bigger.
- (2) The pressing force drops over time due to fatigue and degradation of the belt, or problems caused by insufficient elasticity readily occur, and serviceability is poor.

Other problems also exist.

So the present inventors previously proposed an original transport device provided with a white sheet following the platen glass surface in the device unit installed on the copier, that rubs an original transport roller against the aforementioned platen glass surface through perforations furnished at appropriate locations in said sheet and that can press and transport the original without using an endless belt.

With this original transport device, originals are loaded between the platen glass surface and the original presser sheet by the transport part and said originals are fed backward to butt against a butting plate and are exposed. However, when the originals are fed backward and stopped by the butting plate, and when there is a gap between the white sheet and the butting plate, there is the risk of a problem occurring where the original slips over the butting plate and returns to the paper feed side.

Objective of the invention

In consideration of the aforementioned points, the objective of this invention is to provide an original transport device in which original can stop precisely without slipping over the butting plate.

Constitution of the invention

In order to achieve the aforementioned objective, this invention uses a constitution characterized in that, in an original transport device equipped with a transport part that loads the original between the platen glass surface and the original presser sheet of a copier and that can feed said original backward to butt against a butting plate, there is provided a sheet pressing means that can open and close the gap between the aforementioned sheet and the butting plate.

Application example

Below, this invention is explained with an application example shown in the accompanying figures.

Figure 1 is a cross section of an original transport device of the present invention, Figure 2 is a cross section of the sheet pressing means, and Figure 3 is a front view of the same. In the figures, (1) is the device unit. Said unit (1) is constituted from three major parts – paper feed part (2), transport part (3) and paper discharge part (4) – mounted on platen glass (100) of a copier (not shown).

Paper feed part (2) is equipped with a separating mechanism (7) composed of an original pressing piece (5) and a paper feed roller (6). Originals (200) stacked on stacker (8) furnished at the top part of unit (1) are separated one sheet at a time from the very bottom so that they can be fed onto aforementioned platen glass (100). Platen glass (100) has a smooth top surface (S) over which original (200) can slide, and a butting plate (101) is provided on the top surface toward paper feed part (2).

Transport part (3) transports originals (200) onto platen glass (100); it is equipped with a white sheet (9) and an original transport roller (11) as main components. White sheet (9) is for pressing original (200) during exposure. It is made of a plastic material rich in solid lubricating ability (in this application example, PET = polyethylene terephthalate) and covers the entire surface of top surface (S) of platen glass (100). Said end (9a) of white sheet (9) closest to paper feed part (2) is connected to a twisted coil spring (12), described below, and the end toward the paper discharge part is connected to fixed part (1a) of unit (1). 3 perforations (10) are also furnished at appropriate locations along the center line of white sheet (9) so that the extremity [i.e., surface] of original transport roller (11) sticks out. Said perforations (10) are constituted to be

tapered toward the direction of transport so as not to catch the ends of originals (200) during transport, and are in the form of shogi [Japanese chess] pieces.

Original transport roller (11) is for transporting original (200) on platen glass (100). It turns while pressing original (200) through perforations (10) to be able to transport using friction. A total of 3 are furnished on the reverse side of sheet (9) corresponding to perforations (10). The surfaces of said rollers (11) are covered with an elastic material with a large [amount of] friction (for example, rubber or plastic sponge material), the extremities of which touch surface (S) of platen glass (100) through perforations (10). Original transport rollers (11) can also turn forward or backward to fine tune the final position of original (200) during exposure.

Twisted coil spring (12) furnished at end (9a) of aforementioned white sheet (9) keeps white sheet (9) tight against platen glass (100) during original exposure and is raised from glass (100) during transport to make transport of the original smooth. As long as no pressure is applied to sheet (9), sheet (9) is pulled so that it is lifted above platen glass (100). (13) is a pressing means. Said pressing means (13) with pressing plate (13a) is the same width as sheet (9) to be able to press aforementioned white sheet (9) toward butting plate (101) via pressing plate drive shaft (13b), and furthermore is made of a [illegible] member that has a smooth convexly curved surface on the side that contacts sheet (9). (14) is a torque limiter. Said torque limiter (14) is to maintain a contact state and keep unreasonable load from being applied when pressing plate (13a) touches butting plate (101) or fixed part (1b). Said torque limiter (14) is placed at an appropriate location (in Figure 3, the gear end part of drive shaft (13b)) in the drive transmission system that drives pressing plate drive shaft (13b) and motor (15).

(16) is a paper discharge roller. Said paper discharge roller (16) is furnished in paper discharge part (4) of unit (1) to be able to feed originals (200) out into paper discharge tray (17). (18) is a fixed projection. Said projection (18) is furnished at the end on the paper discharge side of the underside of the paper discharge tray so limit the raised position when white sheet (9) is pulled up.

Next, the function of this invention is explained.

First, originals (200) are stacked on stacker (8) furnished at the top part of unit (1) of the original transport device and their ends are placed at separating mechanism (7) of paper feed part (2). Here, originals (200) are separated one sheet at a time from the very bottom by the pressing force of original pressing piece (5) and friction with paper feed roller (6) and are fed toward transport part (3).

Originals (200) are fed between platen glass (100) of the copier and white sheet (9) by transport part (3), and are transported by original transport rollers (11) through perforations (10) in white sheet (9). At this time, during transport, pressing plate drive shaft (13b) and motor (15) rotate forward and are touching fixed part (1b) of unit (1), so end (9a) of white sheet (9) is pulled

by twisted coil spring (13) [sic] and is raised above platen glass (100). Therefore, originals (200) do not touch white sheet (9). On the other hand, during exposure, originals (200) are fed backward once and stop touching butting plate (101), but at this time, pressing plate (13a) and motor (15) rotate backward and pressing means (13) is pressing white sheet (9), so originals (200) will not skip over butting plate (101) and return toward paper feed part (2) because of white sheet (9) touching butting plate (101). In addition, because originals (200) are pressed tightly against platen glass (100) by white sheet (9), a satisfactory exposure state is realized. While pressing plate (13a) is touching fixed part (1b) of unit (1) and butting plate (101), torque limiter (14) is operating and torque load above a constant [value] is not applied. When exposure is completed, originals (200) are discharged by paper discharge roller (16) of paper discharge part (4) and are stacked in order in paper discharge tray (17).

Effects of the invention

This invention, as above, is characterized in that, in an original transport device equipped with a transport part that loads the original between the platen glass surface and the original presser sheet of a copier and that can feed said original backward to butt against a butting plate, there is provided a sheet pressing means that can open and close the gap between the aforementioned sheet and the butting plate. Thus the gap between the sheet and the butting plate can be closed completely during original transport and there is absolutely no risk of the original skipping over the butting plate and returning toward the paper feed part. Furthermore, by constituting the sheet pressing means with a pressing plate of the same width as the sheet and a pressing plate drive shaft that can turn said pressing plate forward and backward, the gap between the sheet and the butting plate can be opened and closed just by turning the pressing plate drive shaft forward and backward, and in addition, uniform pressing force can be applied to the sheet to produce surface tension. For this reason, not only is it possible to prevent problems that occur during original transport, but other effects include the fact that during exposure, originals are pressed onto the platen glass with uniform force so that improved copy image quality can be realized.

Brief description of the figures

Figure 1 is a cross section of an original transport device of the present invention. Figure 2 is a side view showing the end of the white sheet and the sheet pressing means. Figure 3 is a front view of the pressing plate and the drive system. Figure 4 is a front view showing the relationship between the white sheet and the original transport rollers.

- 1 Unit
- 2 Paper feed part
- 3 Transport part

- 4 Paper discharge part
- 9 White sheet (original presser sheet)
- 10 Perforation
- 11 Original transport roller
- 13 Pressing means
- 13a Pressing plate
- 13b Pressing plate drive shaft
- 14 Torque limiter
- 15 Motor
- 100 Platen glass
- 101 Butting plate
- 200 Original

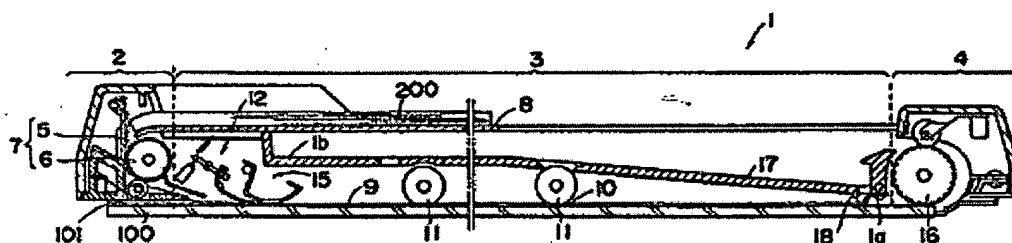


Figure 1

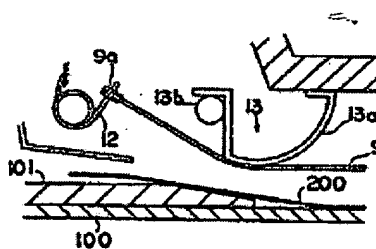


Figure 2 (a)

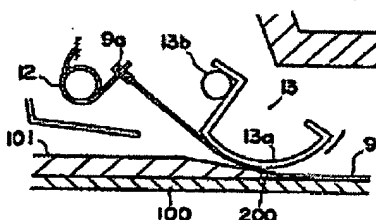


Figure 2 (b)

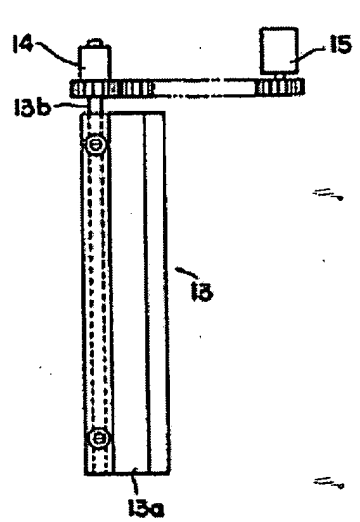


Figure 3

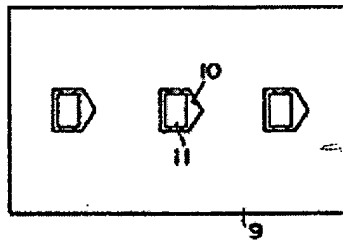


Figure 4